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PART VI

DEPARTMENT OF TRANSPORTATION

Coast Guard

COMMERCIAL DIVING OPERATIONS

General Provisions

[4910-14-M]

Title 46—Shipping

CHAPTER I—COAST GUARD, DEPARTMENT OF TRANSPORTATION

[CGD 76-009]

PART 197—GENERAL PROVISIONS

Commercial Diving Operations

AGENCY: Coast Guard, DOT.

ACTION: Final rule.

SUMMARY: The Coast Guard is issuing regulations governing commercial diving operations from vessels and facilities including vessels required to have a Certificate of Inspection; deepwater ports; and artificial islands, installations, other devices, or otherwise related to activities on the Outer Continental Shelf. Commercial diving exposes individual divers to many hazardous situations that can and have caused marine casualties. These regulations prescribe safety and health standards for commercial diving operations.

EFFECTIVE DATE: February 1, 1979.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION: The Coast Guard published an Advance Notice of Proposed Rulemaking (ANPRM) on August 11, 1975 (40 FR 33681), proposing to amend chapter I of title 46 of the Code of Federal Regulations (CFR) by adding a new subchapter prescribing marine occupational safety and health standards for vessels and facilities that are under Coast Guard jurisdiction. In this ANPRM the Coast Guard proposed to regulate all working conditions and work places under Coast Guard jurisdiction if they are determined to be hazardous to employees, and if the Coast Guard determines that the hazards encountered can be reduced or eliminated by the promulgation of effective regulations.

The Occupational Safety and Health Administration (OSHA), Department of Labor, published an announcement in the FEDERAL REGISTER on October 22, 1975 (40 FR 49123), that it would hold an informal fact-finding hearing on commercial diving operations. The Coast Guard participated in this informal hearing that was conducted in Washington, D.C. on November 11 through 14, 1975.

On June 15, 1976 OSHA published a 6-month Emergency Temporary Standard (ETS) for commercial diving in the FEDERAL REGISTER (41 FR 24272). A Memorandum of Understanding (MOU), covering the relationship between OSHA and the Coast Guard during the 6-month period of the ETS and also during the period of development of final Coast Guard regulations for commercial diving, was signed on June 9, 1976, by the Commandant of the Coast Guard and the Assistant Secretary of Labor for Occupational Safety and Health. The text of the MOU was published with the ETS (41 FR 24291) and contained a provision terminating the MOU "upon the effective date of the Coast Guard standards * * * pertaining to diving operations." The ETS was withdrawn by OSHA on November 5, 1976 (41 FR 48969).

On July 15, 1976, the Coast Guard published an ANPRM in the FEDERAL REGISTER (41 FR 29151) stating that it was considering new regulations prescribing occupational safety and health standards for commercial diving. The Coast Guard invited specific public advice and recommendations on nine enumerated areas, and any general comments to assist it in developing new occupational safety and health regulations for commercial diving in areas of Coast Guard jurisdiction.

During August 1976, the OSHA Advisory Committee on Construction Safety and Health met to discuss materials and information relating to the occupational safety and health aspects of commercial diving operations and to make recommendations to OSHA. The Coast Guard participated in this public proceeding.

On November 5, 1976 OSHA published a Notice of Proposed Rulemaking (NPRM) and Notice of Public Hearings in the FEDERAL REGISTER (41 FR 48950) covering commercial diving operations. Pursuant to the MOU between the Coast Guard and OSHA, the Coast Guard published a Notice in the FEDERAL REGISTER (41 FR 48969 and 41 FR 49208) joining OSHA in the public hearings, scheduled for December 16 through 17, 1976, in New Orleans, to receive public comments for the Coast Guard on the substance of the OSHA proposed standards. During the joint public hearings (December 16 through 21, 1976, and January 10 through 14, 1977) the Coast Guard gave the public an opportunity to comment on Coast Guard regulatory concepts that would be substantively similar to the OSHA proposed standards for commercial diving operations.

On July 22, 1977 OSHA published its final commercial diving standard in the FEDERAL REGISTER (42 FR 37650). Under section 4(b)1 of the Occupational Safety and Health Act of 1970, the OSHA standards do not apply to those diving operations over which the Coast Guard exercises its statutory authority to prescribe or enforce standards or regulations affecting occupational safety and health.

On November 10, 1977, the Coast Guard published a NPRM in the FEDERAL REGISTER (42 FR 58712), with corrections on November 21, 1977 (42 FR 59763), governing commercial diving operations from vessels and facilities subject to Coast Guard jurisdiction. In developing this proposal, the Coast Guard met at various times beginning in 1975 with members of the National Offshore Operations Industry Advisory Committee (NOOIAC). NOOIAC submitted its recommendations to the Coast Guard on June 15, 1977. These recommendations, along with the comments received as a result of the ANPRMs and joint OSHA/CG rulemaking activities, were taken into consideration for the purpose of the NPRM. Pursuant to the MOU the proposed regulation was considered to be substantively similar to the final OSHA commercial diving standard.

The public comment period for the NPRM remained open for written comments until December 27, 1977. A total of 29 written comments were received during the comment period. Commentors included private individuals; companies representing diving contractors, insurance consultants, manufacturers, a deepwater port, offshore exploration; industry and trade associations; five national recreational and sport diving training organizations; and a labor union.

As a result of these written comments, the regulations were revised in part. Many revisions have been made to the regulations to improve clarity without changing the substance of the regulations. Those changes that significantly alter the proposed regulations and those items that received considerable comment and have not been revised and discussed below.

This rule has been reviewed under the Department of Transportation's "Policies Procedures for Simplification, Analysis, and Review of Regulations" (43 FR 9582, March 8, 1978). An evaluation has been prepared, and has been included in the public docket.

DRAFTING INFORMATION

The principal persons involved in drafting this proposal are: Commander Peter T. Muth, Project Manager, Office of Merchant Marine Safety and Mr. Edward J. Gill, Jr., Project Attorney, Office of the Chief Counsel.

DISCUSSION OF MAJOR COMMENTS

PREAMBLE

Although the preamble to the proposed rule indicated that the proposal did not address the qualifications of individual dive team members, including the medical requirements, with the reasons therefor, two commentors made suggestions and recommendations in this area. One commentor commended the Coast Guard for its position on medical qualifications while suggesting that rulemaking for other personnel qualifications be initiated. The other commentor suggested that, as a minimum, the Coast Guard incorporate into this final rule the diving medical guidelines including the psychological screening requirements of the U.S. Navy. The Coast Guard agrees that the qualification of individual dive team members, especially the medical requirements, are important, and has noted that the commercial diving industry, subject to the jurisdiction of the Coast Guard, has established a school to train commercial divers; has physicians trained and experienced in hyperbaric medicine either employed full time or on-call by individual companies and the commercial diving school; has developed and vigorously follows an on-the-job training program encompassing all facets of commercial diving activities; and has established safety and health programs within most individual companies. It is the intent of the Coast Guard to regulate commercial diving operations on vessels and facilities subject to the jurisdiction of the Coast Guard to the extent necessary to insure an acceptable level of personnel safety and health. After careful reconsideration, the Coast Guard has reaffirmed its prior determination that it will not regulate in these areas at this time; however, the Coast Guard intends to publish an Advance Notice of Proposed Rulemaking concerning the qualifications of dive team members including medical requirements.

GENERAL

Several commentors were unsure about the application of this regulation to one atmosphere observation bells, suits, or submersibles. By the definition of "diver," those applications are not covered. The definition of "PVHO" was rewritten to clarify any possible misunderstanding by specifically excluding one atmosphere devices and to preclude a potential erroneous interpretation that the exterior pressure criteria of the ASME Code and ASME PVHO-1 was not required. All the requirements of ASME PVHO-1 are mandatory for new PVHO's. The requirements of 46 CFR 54 or as an alternative, Section VIII, Division 1 of the ASME Code, are, and have been, mandatory for existing PVHO's and include external pressure criteria. The requirements of ASME PVHO-1 are not mandatory for existing PVHO's under § 197.328(b).

Two commentors expressed concern over the exemption from the regulations of diving operations for marine scientific research and development purposes being limited to those conducted by educational institutions. The commentors suggested the words "by educational institutions" be deleted. The Coast Guard does not agree and foresees considerable difficulty differentiating between commercial diving operations for profit under the guise of research and development, and diving operations for purely marine scientific research and development purposes unless the limitation "by educational institutions" is retained.

The regulations allow the Coast Guard to accept substitutes for equipment, materials, apparatus, arrangements, procedures, or tests required by this subpart if the substitute provides an equivalent level of safety. Specific wording permitting equivalent substitutes has been removed from all sections of this rule except in the standard for helium, § 197.340(h). This permits the diving supervisor to determine equivalency to the required standards for helium when helium is obtained outside the United States without applying to the Commandant of the Coast Guard. This does not permit the diving supervisor to use helium meeting a lesser standard as a breathing gas, but only helium meeting the published standard.

Seventeen commentors offered 90 suggestions including numerous alternatives and alternative wording for § 197.208 on the designation of the person-in-charge and the other sections impacted by this section. These comments were accepted, in part, and the regulation has been completely rewritten to clearly define and assign responsibility where it belongs. This necessitated the addition of definitions for "diving supervisor" and "diving installation" and the addition § 197.210 and 197.404. The person-in-charge remains responsible for the vessel or facility, its operation and safety, and the records and reports required by statute or regulation. In addition, the person-in-charge must coordinate the activities on and of the vessel or facility with the diving supervisor so as not to endanger the dive team conducting diving operations. The diving supervisor is in charge of the planning and execution of the commercial diving operation and is responsible for the diving installation, the safety and health of the dive team, and the records and reports required. In addition, the diving supervisor must immediately notify the person-in-charge when a diving accident or casualty occurs, must keep the person-in-charge informed, and coordinate any changes to the planned diving operation with the person-in-charge.

EQUIPMENT

The equipment specifications and equipment requirements apply to each vessel or facility conducting commercial diving operations having a portable diving installation or having an installed diving installation. Nothing in this subpart amends or supercedes the requirements contained in other parts of titles 33 and 46 CFR for the design, plan approval, construction, certification, and inspection required of those vessels or facilities subject to this subpart conducting commercial diving operations and having installed diving systems. Therefore, permanently installed diving installations aboard certificated vessels must comply with 46 CFR 54 regarding pressure vessels, with 46 CFR 56 regarding pressure piping, and with 46 CFR 110 through 113 regarding electrical systems in addition to complying with this subchapter.

Three commentors recommended modification of the requirement that breathing supply hoses be made of kink-resistant material to allow use of synflex hose. The Coast Guard agrees that the wording of the proposal did not allow the use of synflex hose nor properly reflect what was intended. Section 197.312(a)(4) has been modified to clarify that breathing supply hoses are to resist kinking, and that the method of achieving this can be either by initial design and construction of the hose, or by supporting the hose in such a manner as to make it resistant to kinking.

Two comments were received on § 197.312(b)(2). The Coast Guard feels that the present wording clearly shows that markings are required only on diver and open bell umbilicals, not closed bell umbilicals, and that further clarification is unnecessary.

Paragraphs 197.314 (a)(1) and (c)(4) were modified to clarify intent and to specify the contents, dimensions, and packaging of the medical kit in response to several comments received.

In response to a commentor's question, the Coast Guard modified § 197.314(b) to clarify the two-way communications system requirement. This change permits substitution of the vessel or facility ship-to-shore, two-way communications system for the system required by this section if it is readily available to obtain emergency medical assistance.

Three commentors noted that the depth requirement as to when a decompression chamber was required differed between the Coast Guard and

OSHA standards. Two commentors did not offer an opinion as to the depth when it should be required, but recommended that the two agencies agree to the same figure of either 130 fsw or 100 fsw. The other commentor proposed adoption of 66 fsw with the no-decompression limit, or adoption of 100 fsw with the no-decompression limit and an additional requirement of having a decompression chamber any time a diver is working in a "contained space" where there is a chance of becoming "hung-up." This commentor also noted that a secondary breathing gas supply was required when a decompression chamber is required.

The requirement to have a decompression chamber at the dive location also requires additional associated equipment for the chamber (i.e., handling gear to load, unload, and position the decompression chamber; hoses and piping; a secondary breathing gas supply; a larger primary breathing gas supply; and breathing gases for treatment of decompression sickness); additional personnel to load, unload, and operate the decompression chamber and associated equipment; a substantially larger dive location capable of providing the extra space needed and supporting the additional weight; and a method of transportation with at least a fivefold, increased weight-handling capability over a dive not requiring a decompression chamber. Additionally, the requirements for a standby diver, individual surface tending, and more detailed record keeping are based on the determination of where the increased risks to a diver exist.

The incidence rate of decompression sickness among all divers diving within the no-decompression limit at depths less than 130 fsw is very small. Gas embolism can occur at almost any depth, but occurs more frequently at depths less than 66 fsw. (This may be because most air dives take place at depths less than 66 fsw.) Also, the incidence rate occurs more frequently when using SCUBA equipment. However, among experienced divers the incidence rate of gas embolism is small.

It is the opinion of the Coast Guard, based on a review of the entire record as set forth in the preamble of the NPRM, the diver's work environment, and a review of the experience of hundreds of thousands of air dives by military, civilian, governmental, commercial, sport, and recreational, and scientific divers all using the U.S. Navy air tables, that the requirement for a decompression chamber need not be set at a depth less than 130 fsw to protect against potential decompression sickness. The Coast Guard feels a 20 fsw requirement in lieu of a 66 fsw or 100 fsw requirement is not an unreasonable depth to require equipment for treatment of gas embolism. However, a review of the record and comments cited in the NPRM and the experience of many dives does not support protecting commercial divers (professionals) for possible gas embolism by providing additional personnel and equipment for no-decompression dives at depths less than 130 fsw.

After careful reconsideration and reexamination of the comments and records mentioned above, the Coast Guard reaffirms the 130 fsw decompression chamber requirement. However, the Coast Guard agrees with the general philosophy of the commentors regarding a single Federal standard for the same marine activity and has been discussing this subject with OSHA to resolve this issue. Both the Coast Guard and OSHA have determined that additional public input on this subject is desirable and both agencies intend to request additional public comment in a future notice in the FEDERAL REGISTER.

In answer to a commentor, the requirement of § 197.314(c)(5) to have a "capability" could be discharged by having specialized equipment such as a Stoke's litter with the personnel needed to carry it available or by having sufficient personnel to assist an injured diver into the decompression chamber. The wording of this section allows future equipment development to occur that may replace the most common present system of having "sufficient personnel" as long as the objective of getting the injured diver inside the decompression chamber is met.

One commentor recommended that dives at depths less than 40 fsw, or those not involving decompression, be exempt from the requirements of § 197.318. The Coast Guard disagrees. Neither ascent and descent rates nor bottom time can be determined without a timekeeping device. The diving supervisor may not be able to determine whether a diver has been at depths that require a decompression obligation without a gage available indicating diver depth (i.e., a diver working at 28 fsw for 6 hours vice at 32 fsw for 6 hours). Without the combined information of bottom time and depth available to the diving supervisor, the safety and health of the diver may be in jeopardy.

Many commentors objected to, and offered rewording for, "be made of corrosion-resistant material" where required for diving ladders, stages, and open bells (§§ 197.320 and 197.334). The Coast Guard agrees that the wording of the proposal was too restrictive and has rewritten those requirements. This wording allows either construction using corrosion-resistant material, or application of anti-corrosion coatings to protect the structural integrity of the device.

Two commentors suggested that the requirement of § 197.320(b)(3) be modified to allow the use of a diving ladder instead of a diving stage under certain conditions. The Coast Guard disagrees. Divers diving at depths deeper than 130 fsw, or outside the no-decompression limits, are more likely to be tired and need the additional assistance a diving stage affords over a diving ladder. A diving stage also provides a haven during in-water decompression stops. If because of conditions at the dive site, the use of a diving stage would likely cause an injury, § 197.202(b) allows a deviation from this requirement. If the use of the diving stage is unreasonable or impractical, § 197.206(b) provides that the Commandant of the Coast Guard may permit the use of alternative equipment or procedures that insure a degree of safety consistent with the minimum standard afforded by a diving stage.

One commentor suggested that § 197.326(b) be amended to allow ball valves to be used as PVHO pressure boundary shutoff valves in oxygen systems. The Coast Guard agrees and has amended the proposal accordingly.

Section 197.328(d)(3) has been changed in response to one commentor to clearly indicate that overpressurization of the PVHO is intended to be protected by this requirement and not the pressure piping. Pressure piping is protected by the pressure relief devices required by the ANSI Code.

The requirement that each PVHO must have a pressure sealing hatch (§ 197.328(c)(4) of the proposal) has been deleted. This requirement did not add anything that was not already required by the design Codes and was a point of confusion to two commentors.

Three commentors recommended modifications to the requirement for PVHO two-way voice communications systems. These comments were accepted, in part, and § 197.328(d) (6) and (7) and § 197.332(m) have been rewritten to clearly specify intent and set forth the requirements. The Coast Guard considers voice communications between the diving supervisor and occupants of a PVHO, between occupants in separately pressurized compartments of the same PVHO, and between the occupant of a closed bell and a diver in the water being supported from that closed bell as the minimum standards for the safety and health of the dive team members. Additionally, if two separate PVHO's are designed to mechanically couple and become in effect one PVHO, these two-way voice communications system requirements apply when the PVHO's are mechanically coupled. The Coast

Guard did not intend to have redundant sound-powered communications systems in decompression chambers, and permits only one two-way voice communications system in a decompression chamber if the system is sound-powered. The configuration and operation of the required communications system is not specified, allowing any system that provides the required two-way voice contacts.

Four commentors pointed out that internal pressure gages were not required for PVHO's unless the PVHO atmosphere can be controlled internally. The Coast Guard agrees and has rewritten § 197.328(d)(7).

The Coast Guard has rewritten the viewport requirements of § 197.328(d)(8) and (9). As previously worded, it could have been interpreted to require that all occupants of dual- or multiple-lock PVHO's had to be seen from the exterior through one viewport, even if the PVHO has more than one viewport. In most situations, this would be impossible. The intent of the regulation is to require sufficient viewports to allow observation of all occupants from the exterior. If a PVHO is designed such that a single viewport would allow observation of all occupants, that design would satisfy this requirement.

Three commentors made suggestions concerning the requirement for a fire extinguisher inside a PVHO. The Coast Guard reviewed the causes of several PVHO fires, and has amended the proposed regulations to require a means of extinguishing a fire in the interior. Past experience indicates that fire prevention is most important and can be enhanced by keeping combustible materials, sources of heat and sparks, and all nonessential or potentially hazardous equipment, including electrical systems, to an absolute minimum inside a PVHO. Known combustible materials or sources of ignition required inside a PVHO should be isolated from the PVHO atmosphere and purged with inert gas, where possible, or maintained in a area easily accessible by an occupant to facilitate extinguishing a fire. Localized fires that have been combatible in the past have been extinguished with water or sand.

Two commentors recommended that § 197.328(c)(19) of the NPRM be amended to exempt additional electrical equipment inside PVHO's such as communications speakers and medical measurement instrumentation. Electrical systems, besides being a potential shock hazard, can present a source of ignition as well as the fuel required for combustion. Additionally, electrical shock hazards and possible galvanic action of the PVHO need to be considered when designing and maintaining interior electrical systems. The Coast Guard has carefully reviewed the proposed requirements and the comments received in the context of present-day equipment available, and has rewritten § 197.328(d)(18).

One commentor requested clarification of § 197.330(a)(6). This requirement assists surface personnel in locating and retrieving a closed bell after the umbilical has been severed. The emergency locating device required is not limited to the following but could be, active (i.e., an acoustical pinger), passive (i.e., a sonar reflector or target), or some other device (i.e., a surface buoy with attaching line releasible by either the closed bell occupants and/or remotely from the surface).

Three commentors suggested alternative language and alternatives to the requirements for a 12-hour breathing gas supply independent of the surface. The Coast Guard agrees, in part, with the suggestions and has rewritten § 197.330(a)(8). This revision recognizes that scrubbing and recirculating of breathing gases is an alternative to an independent breathing gas supply of sufficient volume and pressure to last for 12 hours. Also, having a sufficient breathing gas supply does not by itself provide life support as other considerations must be taken into account (i.e., thermal protection). The revision also allows a reduced life support capability if there are two independent retrieval systems for the closed bell.

One commentor suggested that § 197.332(d) be reworded to account for shipping dogs. Shipping dogs are constructed to be operated from only one side of a man-way or hatch, are never used to obtain a pressure seal, and are only used during shipping to prevent damage to the decompression chamber. When the decompression chamber is occupied, shipping dogs are removed or disabled by securing them out of the way. The Coast Guard agrees and has revised this requirement.

The proposed illumination levels for the interior of a decompression chamber were addressed by five commentors. Two commentors suggested deletion of the requirement as illumination was already covered by "PVHO-General" requirements. Two commentors expressed concern regarding fire prevention. Comments also addressed the "convenience" aspects of bunk reading lights. The Coast Guard agrees, in part, with the philosophy expressed; however, the lighting requirements addressed within the decompression chamber requirements are in addition to "General" PVHO illumination requirements. The general PVHO illumination requirement addressed work and operating conditions. The decompression chamber interior illumination requirement is directed not toward "convenience items" but being able to visually observe, treat, medically diagnose, and medically assist, if necessary, occupants undergoing decompression or treatment for decompression sickness. Therefore, the Coast Guard has rewritten § 197.332(e) for clarity.

The requirement for compressed gas cylinders, § 197.338(e), has been modified to allow the use of cylinders designed and constructed under the requirements of Part 54 of this Chapter, which requires a greater design safety factor for pressure vessels aboard certificated vessels than the standard of 49 CFR 178 Subpart C.

Two commentors recommended that § 197.346(b) be modified to allow a diver to select equipment he will use for a particular dive. The Coast Guard agrees in part, and has modified this requirement by requiring that a helmet cushion and weighted shoes be provided to the diver, but has not required them to be worn by the diver. When using a heavy-weight diving outfit, the absence of weighted shoes could pose an unintended risk to a diver's safety under some conditions; however, this risk may be avoided by the use of leg or ankle weights.

One commentor observed that the requirements of § 197.346(d)(5) regarding a "life-line" and a "communications cable" can be met in some cases by a communications cable in the hose group that has a breaking strength equal to or exceeding that required of a life-line. The Coast Guard agrees, and under such a circumstance would not require a separate life-line.

One commentor suggested that § 197.346(f) be modified to also exclude from the diver-carried reserve breathing gas requirement, diving with a stage nearby having a sufficient supply of breathing gases or a closed or open bell. The Coast Guard disagrees. An inexhaustable supply of breathing gas just beyond the immediate reach of a diver in distress may never be used. A reserve breathing gas supply, when required, should always be within the immediate reach of a diver, except when it becomes a greater hazard to the diver's safety than the diver not having it. In such a case, alternatives, such as the commentor suggested, should be considered.

OPERATIONS

One commentor requested clarification of what was meant by the post dive requirement in the proposal to check the physical condition of the diver. This has been clarified in § 197.410(a)(7)(i).

Five commentors suggested the requirement proposed in § 197.420(a) to have an operations manual prepared for each vessel or facility from which diving operations are conducted be modified. The Coast Guard agrees, in part, and with the rewriting of respon-

sibilities has revised this requirement so that the diving supervisor provides to the person-in-charge and the dive team an operations manual. The intent of the proposed requirement to have an operations manual tailored to a specific situation is retained by requiring certain modifications to be made in writing.

SPECIFIC DIVING MODE PROCEDURES

Two commentors proposed that the depth requirement for the use of a closed bell (§ 197.434(d) of this rule) be changed from 300 fsw to 350 fsw. The Coast Guard disagrees. The Coast Guard, however, realizes that there may be specific commercial diving operations at depths greater than 300 fsw where the use of a closed bell may not be indicated and feels that § 197.206(b) allows a viable alternative.

One commentor pointed out that the proposed requirement in § 197.434(f)(2), that a standby diver be available one hour before the return of a closed bell to the dive location during saturation diving is impractical. An operational emergency could arise at any time that could require returning the closed bell to the dive location. The Coast Guard agrees and has rewritten the proposed requirements as § 197.434(g). The standby diver requirement for closed bell retrieval during saturation diving has been removed. A requirement that a member of the topside crew be diver-qualified and available has been substituted.

One commentor requested clarification of the prohibition against liveboating at night. The intent was to prohibit liveboating operations when the direction that the umbilical tends in the water, or when the "bubbles" from the diver, are not visible to the dive team member at the dive location continuously tending the diver. Also, the vessel from which liveboating operations are being conducted should be visible to other vessels transiting the area for the safety of the diver. This clarification has been made by prohibiting liveboating from 1 hour after sunset to 1 hour before sunrise or during periods of restricted visibility as defined in a new § 197.436(b).

Two commentors proposed that the depth limitation for liveboating be changed from 200 fsw to 250 fsw. The figure of 200 fsw appearing in § 197.436(a) was an unnoticed, typographical error appearing in the NPRM. The Coast Guard intended that there be a limitation of 220 fsw which is compatible with the 220 fsw bell requirement. The Coast Guard disagrees with changing the limitation for liveboating from 220 to 250 fsw. However, § 197.206(b) provides an alternative when there is a specific commercial diving operation that requires liveboating at depths greater than 220 fsw.

One commentor felt the requirement for a diver pick-up boat during liveboating operations was unnecessary as the vessel from which liveboating is supported should be able to make the diver pick-up. The commentor felt a second vessel might exacerbate the hazard to the diver in the water. However, under the worst situation, the vessel is most likely to have its screws fouled with a severed umbilical and be dead-in-the-water. Further, liveboating by definition could be conducted from a barge. Diver pick-up, in either case, might be difficult without the required pick-up boat, if possible at all. The Coast Guard has retained the requirement for a boat for diver pick-up in § 197.436(a)(4) thereby allowing the person-in-charge the option to utilize his vessel or the boat for picking up the diver in distress, whichever under the specific circumstances would be more appropriate.

PERIODIC TESTS AND INSPECTIONS OF DIVING EQUIPMENT

One commentor recommended that the words "repair or modification" in § 197.450(a) be changed to "overhaul" because there are many repairs or modifications that may not affect the quality of the breathing gas output of an air compressor. The same argument could be used regarding the word "overhaul." The tests required are not only for quality but also for quantity. The tests required are to be performed after every repair or modification to the compressor (such as, the speed at which it is driven, pressure boundaries, intake and exhaust piping arrangements, etc.) which might affect the quantity and/or quality of the compressor output. Retightening a foundation mounting nut of the compressor or straightening a bent dip stick on the prime mover are not intended to be considered "repairs" under this section.

One commentor suggested that a Compressed Gas Association (CGA) pamphlet, G-4.1 entitled "Cleaning Equipment for Oxygen Service," be referenced in § 197.452 and other CGA pamphlets be referenced elsewhere in this regulation. The Coast Guard disagrees. The Coast Guard, in preparing the NPRM, considered all CGA standards through December 1976 and found many of the standards had already made their way into regulations. Some of these regulations have been referenced in this subpart and thereby incorporated (i.e., 49 CFR 173.34 incorporated CGA pamphlet C-6, 1968 edition, and CGA pamphlet C-8, 1972 edition). The Coast Guard noted during its review of the CGA standards and publications that they were not developed with human life support under hyperbaric conditions as the main objective and therefore in some areas were neither complete nor acceptable.

One commentor recommended the exclusion of cylinders from the requirements of § 197.462 since they would be tested according to the appropriate DOT regulations. The Coast Guard disagrees. It is not the Coast Guard's intention to subject any pressure vessel to duplicate inspection and testing requirements. The "appropriate DOT regulations" apply to cylinders in interstate commerce and may not cover after purchase a significant percentage of cylinders used for diving. If a cylinder is inspected and tested annually with a hydrostatic test every fifth year in accordance with 49 CFR 173.34, it meets the requirements of this section.

One commentor expressed concern regarding the leak test requirement. In response, the Coast Guard has rewritten § 197.462(g) to set out the leak test procedures.

RECORDS

The revision of this regulation previously discussed regarding the person-in-charge and diving supervisor, required major revision to this portion of the regulations. The official logbook (Coast Guard form CG-706) required by statute is retained. Those vessels or facilities not required to have an official logbook by 46 U.S.C. 201 are required to have a logbook, as is the diving supervisor. The size, shape, and form of the logbook is left to the discretion of the person-in-charge or diving supervisor. The entries of the person-in-charge in either the official logbook or logbook have been reduced in quantity.

The entries required of the diving supervisor to be entered in the supervisor's logbook are much more detailed. They include entries similar to those required to be entered by the person-in-charge, specific information about the dive and divers, a record of the diving activity, equipment history including testing, etc. The Coast Guard recognizes that many of the records and entries required are not kept at the dive location. The Coast Guard does not require copying the information into the logbook or duplicating these existing records, as long as an entry is made in the diving supervisory's logbook at the dive location indicating where the records are physically available.

Several commentors suggested that form CG-2692 was not indicated for a diving casualty as required by § 197.486(b) but rather for a vessel casualty not involving diving. The Coast Guard agrees and has deleted this requirement. Section 197.486 was also rewritten to clarify that form CG-924E is required only when the dive location

is a vessel, and that a written narrative report is required when the dive location is a facility.

In consideration of the foregoing, Chapter I of Title 46 of the Code of Federal Regulations is amended as follows:

PART 54—PRESSURE VESSELS

1. By adding a new § 54.01-17 to read as follows:

§ 54.01-17 Pressure vessel for human occupancy (PVHO).

Pressure vessels for human occupancy (PVHO's) must meet the requirements of subpart B (Commercial Diving Operations) of part 197 of this chapter.

PART 56—PIPING SYSTEMS AND APPURTENANCES

2. By adding a new § 56.50-110 to read as follows:

§ 56.50-110 Diving support systems.

(a) In addition to the requirements of this part, piping for diving installations which is permanently installed on the vessel must meet the requirements of subpart B (Commercial Diving Operations) of part 197 of this chapter.

(b) Piping for diving installations which is not permanently installed on the vessel need not meet the requirements of this part, but must meet the requirements of subpart B of part 197 of this chapter.

(c) Piping internal to a pressure vessel for human occupancy (PVHO) need not meet the requirements of this part, but must meet the requirements of subpart B of part 197 of this chapter.

PART 110—GENERAL PROVISIONS

3. By adding a new § 110.05-8 to read as follows:

§ 110.05-8 Electrical systems internal to pressure vessels for human occupancy (PHVO).

Electrical systems internal to a pressure vessel for human occupancy (PVHO) need not meet the requirements of this subchapter, but must meet the requirements of subpart B (Commercial Diving Operations) of part 197 of this chapter.

4. And by adding a new subchapter V, consisting at this time of part 197, subpart B, to read as follows:

SUBCHAPTER V—MARINE OCCUPATIONAL SAFETY AND HEALTH STANDARDS

PART 197—GENERAL PROVISIONS

Subpart A—(Reserved)

Subpart B—Commercial Diving Operations

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AUTHORITY: (46 U.S.C. 239; 46 U.S.C. 390b; 46 U.S.C. 391a; 33 U.S.C. 1509(b); 43 U.S.C. 1333(d)(1); 43 U.S.C. 1331 et seq., as amended by Sec. 203 and 208 of Pub. L. 95-372; 46 U.S.C. 395; 46 U.S.C. 375; 46 U.S.C. 391; 46 U.S.C. 392; 46 U.S.C. 416; 49 U.S.C. 1655(b); 49 CFR 1.46 (b) and (s).)

Subpart A—[Reserved]

Subpart B—Commerical Diving Operations

GENERAL

§ 197.200 Purpose of subpart.

This subpart presqribes rules for the design, construction, and use of equipment, and inspection, operation, and safety and health standards for commercial diving operations taking place from vessels and facilities under Coast Guard jurisdiction.

§ 197.202 Applicability.

(a) This subpart applies to commercial diving operations taking place at any deepwater port or the safety zone thereof as defined in 33 CFR 150; from any artificial island, installation, or other device on the Outer Continental Shelf and the waters adjacent thereto as defined in 33 CFR 147 or otherwise related to activities on the Outer Continental Shelf; and from all vessels required to have a certificate of inspection issued by the Coast Guard including mobile offshore drilling units regardless of their geographic location, or from any vessel connected with a deepwater port or within the deepwater port safety zone, or from any vessel engaged in activities related to the Outer Continental Shelf; except that this subpart does not apply to any diving operation—

(1) Performed solely for marine scientific research and development purposes by educational institutions;

(2) Performed solely for research and development for the advancement of diving equipment and technology; or

(3) Performed solely for search and rescue or related public safety purposes by or under the control of a governmental agency.

(b) Diving operations may deviate from the requirements of this subpart to the extent necessary to prevent or minimize a situation which is likely to cause death, injury, or major environmental damage. The circumstances leading to the situation, the deviations made, and the corrective action taken, if appropriate, to reduce the possibility of recurrence shall be recorded by the diving supervisor in the logbook as required by § 197.482(c).

§ 197.204 Definitions.

As used in this subpart:

"ACFM" means actual cubic feet per minute.

"ANSI Code" means the B31.1 American National Standards Insti-

tute "Code for Pressure Piping, Power Piping."

"ASME Code" means the American Society of Mechanical Engineers "Boiler and Pressure Vessel Code."

"ASME PVHO-1" means the ANSI/ASME standard "Safety Standard for Pressure Vessels for Human Occupancy."

"ATA" means a measure of pressure expressed in terms of atmosphere absolute (includes barometric pressure).

"Bell" means a compartment either at ambient pressure (open bell) or pressurized (closed bell) that allows the diver to be transported to and from the underwater work site, allows the diver access to the surrounding environment, and is capable of being used as a refuge during diving operations.

"Bottom time" means the total elapsed time measured in minutes from the time the diver leaves the surface in descent to the time to the next whole minute that the diver begins ascent.

"Breathing gas/breathing mixture" means the mixed-gas, oxygen, or air as appropriate supplied to the diver for breathing.

"Bursting pressure" means the pressure at which a pressure containment device would fail structurally.

"Commercial diver" means a diver engaged in underwater work for hire excluding sport and recreational diving and the instruction thereof.

"Commercial diving operation" means all activities in support of a commercial diver.

"Cylinder" means a pressure vessel for the storage of gases under pressure.

"Decompression chamber" means a pressure vessel for human occupancy such as a surface decompression chamber, closed bell, or deep diving system especially equipped to recompress, decompress, and treat divers.

"Decompression sickness" means a condition caused by the formation of gas or gas bubbles in the blood or body tissue as a result of pressure reduction.

"Decompression table" means a profile or set of profiles of ascent rates and breathing mixtures designed to reduce the pressure on a diver safely to atmospheric pressure after the diver has been exposed to a specific depth and bottom time.

"Depth" means the maximum pressure expressed in feet of seawater attained by a diver and is used to express the depth of a dive.

"Dive location" means that portion of a vessel or facility from which a diving operation is conducted.

"Dive team" means the divers and diver support personnel involved in a diving operation, including the diving supervisor.

"Diver" means a person working beneath the surface, exposed to hyperbaric conditions, and using underwater breathing apparatus.

"Diver-carried reserve breathing gas" means a supply of air or mixed-gas, as appropriate, carried by the diver in addition to the primary or secondary breathing gas supplied to the diver.

"Diving installation" means all of the equipment used in support of a commercial diving operation.

"Diving mode" means a type of diving requiring SCUBA, surface-supplied air, or surface-supplied mixed-gas equipment, with related procedures and techniques.

"Diving stage" means a suspended platform constructed to carry one or more divers and used for putting divers into the water and bringing them to the surface when in-water decompression or a heavy-weight diving outfit is used.

"Diving supervisor" means the person having complete responsibility for the safety of a commercial diving operation including the responsibility for the safety and health of all diving personnel in accordance with this subpart.

"Facility" means a deepwater port, or an artificial island, installation, or other device on the Outer Continental Shelf subject to Coast Guard jurisdiction.

"Fsw" means feet of seawater (or equivalent static pressure head).

"Gas embolism" means a condition caused by expanding gases, which have been taken into and retained in the lungs while breathing under pressure, being forced into the bloodstream or other tissues during ascent or decompression.

"Heavy-weight diving outfit" means diver-worn surface-supplied deep-sea dress.

"Hyperbaric conditions" means pressure conditions in excess of surface atmospheric pressure.

"Injurious corrosion" means an advanced state of corrosion which may impair the structural integrity or safe operation of the equipment.

"Liveboating" means the support of a surfaced-supplied diver from a vessel underway.

"Maximum working pressure" means the maximum pressure to which a pressure containment device can be exposed under operating conditions (usually the pressure setting of the pressure relief device).

"No-decompression limits" means the air depth and bottom time limits of appendix A.

"Pressure vessel" means a container capable of withstanding an internal maximum working pressure over 15 psig.

"Psi(g)" means pounds per square inch (gage).

"PVHO" means pressure vessel for human occupancy but does not include pressure vessels for human occupancy that may be subjected to external pressures in excess of 15 psig but can only be subjected to maximum internal pressures of 15 psig or less (i.e., submersibles, or one atmosphere observation bells).

"Saturation diving" means saturating a diver's tissues with the inert gas in the breathing mixture to allow an extension of bottom time without additional decompression.

"SCUBA diving" means a diving mode in which the diver is supplied with a compressed breathing mixture from diver carried equipment.

"Standby diver" means a diver at the dive location available to assist a diver in the water.

"Surface-supplied air diving" means a diving mode in which the diver is supplied from the dive location or bell with compressed breathing air including oxygen or oxygen enriched air if supplied for treatment.

"Surface-supplied mixed-gas diving" means a diving mode in which the diver is supplied from the dive location or bell with a compressed breathing mixture other than air.

"Timekeeping device" means a device for measuring the time of a dive in minutes.

"Treatment table" means a depth, time, and breathing gas profile designed to treat a diver for decompression sickness.

"Umbilical" means the hose bundle between a dive location and a diver or bell, or between a diver and a bell, that supplies the diver or bell with a life-line, breathing gas, communications, power, and heat as appropriate to the diving mode or conditions.

"Vessel" means any waterborne craft including mobile offshore drilling units required to have a Certificate of Inspection issued by the Coast Guard or any waterborne craft connected with a deepwater port or within the deepwater port safety zone, or any waterborne craft engaged in activities related to the Outer Continental Shelf.

"Volume tank" means a pressure vessel connected to the outlet of a compressor and used as an air reservoir.

"Working pressure" means the pressure to which a pressure containment device is exposed at any particular instant during normal operating conditions.

§ 197.205 Availability of standards.

(a) Several standards have been incorporated by reference in this subchapter. The incorporation by reference has been approved by the Direc-

tor of the FEDERAL REGISTER under the provisions of 1 CFR Part 51.

(b) The standards are available from the appropriate organizations whose addresses are listed below:

(1) American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.

(2) American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, N.Y. 10017.

§ 197.206 Substitutes for required equipment, materials, apparatus, arrangements, procedures, or tests.

(a) The Coast Guard may accept substitutes for equipment, materials, apparatus, arrangements, procedures, or tests required in this subpart if the substitute provides an equivalent level of safety.

(b) In any case where it is shown to the satisfaction of the Commandant that the use of any particular equipment, material, apparatus, arrangement, procedure, or test is unreasonable or impracticable, the Commandant may permit the use of alternate equipment, material, apparatus, arrangement, procedure, or test to such an extent and upon such condition as will insure, to his satisfaction, a degree of safety consistent with the minimum standards set forth in this Subpart.

§ 197.208 Designation of person-in-charge.

(a) The owner or agent of a vessel or facility without a designated master shall designate, in writing, an individual to be the person-in-charge of the vessel or facility.

(b) Where a master is designated, the master is the person-in-charge.

§ 197.210 Designation of diving supervisor.

The name of the diving supervisor for each commercial diving operation shall be—

(a) Designated in writing; and

(b) Given to the person-in-charge prior to the commencement of any commercial diving operation.

EQUIPMENT

§ 197.300 Applicability.

(a) Each diving installation used on each vessel or facility subject to this subpart must meet the requirements of this subpart.

(b) In addition to the requirements of this subpart, equipment which is permanently installed on vessels and is part of the diving installation must meet subchapters F and J of this chapter.

(c) All repairs and modifications to pressure vessels used for commercial diving operations must be made in accordance with the requirements of section VIII, division 1 or division 2 of the ASME Code, ASME PVHO-1, part 54 of this chapter, or 49 CFR 173.34, as applicable.

(d) All repairs and modifications to pressure piping used for commercial diving operations must be made in accordance with the requirements of the ANSI Code or part 56 of this chapter, as applicable.

§ 197.310 Air compressor system.

A compressor used to supply breathing air to a diver must have—

(a) A volume tank that is—

(1) Built and stamped in accordance with section VIII, division 1 of the ASME Code with—

(i) A check valve on the inlet side;

(ii) A pressure gage;

(iii) A relief valve; and

(iv) A drain valve; and

(2) Tested after every repair, modification, or alteration to the pressure boundaries as required by § 197.462;

(b) Intakes that are located away from areas containing exhaust fumes of internal combustion engines or other hazardous contaminants;

(c) An efficient filtration system; and

(d) Slow-opening shut-off valves when the maximum allowable working pressure of the system exceeds 500 psig.

§ 197.312 Breathing supply hoses.

(a) Each breathing supply hose must—

(1) Have a maximum working pressure that is equal to or exceeds—

(i) The maximum working pressure of the section of the breathing supply system in which used; and

(ii) The pressure equivalent of the maximum depth of the dive relative to the supply source plus 100 psig;

(2) Have a bursting pressure of four times its maximum working pressure;

(3) Have connectors that—

(i) Are made of corrosion-resistant material;

(ii) Are resistant to accidental disengagement; and

(iii) Have a maximum working pressure that is at least equal to the maximum working pressure of the hose to which they are attached; and

(4) Resist kinking by—

(i) Being made of kink-resistant materials; or

(ii) Having exterior support.

(b) Each umbilical must—

(1) Meet the requirements of paragraph (a) of this section; and

(2) Be marked from the diver or open bell end in 10-foot intervals to 100 feet and in 50-foot intervals thereafter.

§ 197.314 First aid and treatment equipment.

(a) Each dive location must have—

(1) A medical kit approved by a physician that consists of—

(i) Basic first aid supplies; and

(ii) Any additional supplies necessary to treat minor trauma and illnesses resulting from hyperbaric exposure;

(2) A copy of an American Red Cross Standard First Aid handbook;

(3) A bag-type manual resuscitator with transparent mask and tubing; and

(4) A capability to remove an injured diver from the water.

(b) Each diving installation must have a two-way communications system to obtain emergency assistance except when the vessel or facility ship-to-shore, two-way communications system is readily available.

(c) Each dive location supporting mixed-gas dives, dives deeper than 130 fsw, or dives outside the no-decompression limits must meet the requirements of paragraph (a) of this section and have—

(1) A decompression chamber;

(2) Decompression and treatment tables;

(3) A supply of breathing gases sufficient to treat for decompression sickness;

(4) The medical kit required by paragraph (a)(1) of this section that is—

(i) Capable of being carried into the decompression chamber; and

(ii) Suitable for use under hyperbaric conditions; and

(5) A capability to assist an injured diver into the decompression chamber.

§ 197.318 Gages and timekeeping devices.

(a) A gage indicating diver depth must be at each dive location for surface-supplied dives.

(b) A timekeeping device must be at each dive location.

§ 197.320 Diving ladder and stage.

(a) Each diving ladder must—

(1) Be capable of supporting the weight of at least two divers;

(2) Extend 3 feet below the water surface;

(3) Be firmly in place;

(4) Be available at the dive location for a diver to enter or exit the water unless a diving stage or bell is provided; and

(5) Be—(i) Made of corrosion-resistant material; or

(ii) Protected against and maintained free from injurious corrosion.

(b) Each diving stage must—

(1) Be capable of supporting the weight of at least two divers;

(2) Have an open-grating platform;

(3) Be available for a diver to enter or exit the water from the dive location and for in-water decompression if the diver is—

(i) Wearing a heavy-weight diving outfit; or

(ii) Diving outside the no-decompression limits, except when a bell is provided; and

(4) Be—(i) Made of corrosion-resistant material; or

(ii) Protected against and maintained free from injurious corrosion.

§ 197.322 Surface-supplied helmets and masks.

(a) Each surface-supplied helmet or mask must have—

(1) A nonreturn valve at the attachment point between helmet or mask and umbilical that closes readily and positively;

(2) An exhaust valve; and

(3) A two-way voice communication system between the diver and the dive location or bell.

(b) Each surface-supplied air helmet or mask must—

(1) Ventilate at least 4.5 ACFM at any depth at which it is operated; or

(2) Be able to maintain the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.

§ 197.324 Diver's safety harness.

Each safety harness used in surface-supplied diving must have—

(a) A positive buckling device; and

(b) An attachment point for the umbilical life line that—

(1) Distributes the pulling force of the umbilical over the diver's body; and

(2) Prevents strain on the mask or helmet.

§ 197.326 Oxygen safety.

(a) Equipment used with oxygen or oxygen mixtures greater than 40 percent by volume must be designed for such use.

(b) Oxygen systems with pressures greater than 125 psig must have slow-opening shut-off valves except pressure boundary shut-off valves may be ball valves.

§ 197.328 PVHO—General.

(a) Each PVHO, contracted for or purchased after February 1, 1979, must be built and stamped in accordance with ASME PVHO-1.

(b) Each PVHO, contracted for or constructed before February 1, 1979, and not Coast Guard approved, must be submitted to the Coast Guard for approval prior to February 1, 1984.

(c) To be approved under paragraph (b), a PVHO must be—

(1) Constructed in accordance with Part 54 of this Chapter; or—

(2) Be built in accordance with section VIII, division 1 or division 2 of the ASME Code; and—

(i) Have the plans approved in accordance with § 54.01-18 of this chapter;

(ii) Pass the radiographic and other survey tests of welded joints required by section VIII, division 1 or division 2, as appropriate, of the ASME Code; and

(iii) Pass—(A) The hydrostatic test described in § 54.10-10 of this chapter; or

(B) The pneumatic test described in § 54.10-15 of this chapter and such additional tests as the Officer-in-Charge, Marine Inspection (OCMI) may require.

(d) Each PVHO must—

(1) Have a shut-off valve located within 1 foot of the pressure boundary on all piping penetrating the pressure boundary;

(2) Have a check valve located within 1 foot of the pressure boundary on all piping exclusively carrying fluids into the PVHO;

(3) Have the pressure relief device required by ASME PVHO-1;

(4) Have a built-in breathing system with at least one mask per occupant stored inside each separately pressurized compartment;

(5) Have a two-way voice communications system allowing communications between an occupant in one pressurized compartment of the PVHO and—

(i) The diving supervisor at the dive location;

(ii) Any divers being supported from the same PVHO; and

(iii) Occupants of other separately pressurized compartments of the same PVHO;

(6) If designed to mechanically couple to another PVHO, have a two-way communications system allowing communications between occupants of each PVHO when mechanically coupled;

(7) Have a pressure gage in the interior of each compartment that is—

(i) Designed for human occupancy; and

(ii) Capable of having the compartment pressure controlled from inside the PVHO;

(8) Have viewports that allow observation of occupants from the outside;

(9) Have viewports that meet the requirements of ASME PVHO-1 except those PVHO's approved under paragraph (b) of this section which have nonacrylic viewports;

(10) Have means of illumination sufficient to allow an occupant to—

(i) Read gages; and

(ii) Operate the installed systems within each compartment;

(11) Be designed and equipped to minimize sources of combustible materials and ignition;

(12) Have a protective device on the inlet side of PVHO exhaust lines;

(13) Have a means of extinguishing a fire in the interior;

(14) Have a means of maintaining the oxygen content of the interior atmosphere below 25 percent surface equivalent by volume when pressurized with air as the breathing mixture;

(15) Have a means of maintaining the interior atmosphere below 2 percent surface equivalent carbon dioxide by volume;

(16) Have a means of overriding and controlling from the exterior all interior breathing and pressure supply controls;

(17) Have a speech unscrambler when used with mixed-gas;

(18) Have interior electrical systems that are designed for the environment in which they will operate to minimize the risk of fire, electrical shock to personnel, and galvanic action of the PVHO; and

(19) Be tested after every repair, modification, or alteration to the pressure boundaries as required by § 197.462.

§ 197.330 PVHO—Closed bells.

(a) Except as provided in paragraph (b) of this section, each closed bell must meet the requirements of § 197.328 and—

(1) Have underwater breathing apparatus for each occupant stored inside each separately pressurized compartment;

(2) Have an umbilical;

(3) Have lifting equipment attached to the closed bell capable of returning the occupied closed bell when fully flooded to the dive location;

(4) Be capable of recompressing on the surface to the maximum design diving depth;

(5) Be constructed and equipped as required by § 197.332;

(6) Have an emergency locating device designed to assist personnel on the surface in acquiring and maintaining contact with the submerged PVHO if the umbilical to the surface is severed;

(7) Have a capability to remove an injured diver from the water; and

(8) Have a life support capability for the intact closed bell and its occupants for—

(i) Twelve hours after an accident severing the umbilical to the surface when the umbilical to the surface is the only installed means of retrieving the closed bell; or

(ii) A period of time, at least equal to 1 hour plus twice the time required to retrieve the bell from its designed operating depth and attach an auxiliary lifesupport system, after an accident severing the umbilical to the surface when the umbilical is one of the two independent installed means of retrieving the closed bell, each meeting the requirements of paragraph (a)(3) of this section.

(b) A closed bell that does not meet the requirements of paragraphs (a)(3), (a)(4), and (a)(5) of this section, must be capable of attachment to another PVHO that—

(1) Allows the transfer of personnel and diver's equipment under pressure from the closed bell to the PVHO;

(2) Meets the requirements of paragraph (a)(3) of this section;

(3) Is capable of attachment to a decompression chamber meeting the requirements of paragraphs (a)(4) and (a)(5) of this section; and

(4) Allows the transfer of personnel and diver's equipment under pressure from the PVHO to the decompression chamber.

§ 197.332 PVHO—Decompression chambers.

Each decompression chamber must—

(a) Meet the requirements of § 197.328;

(b) Have internal dimensions sufficient to accommodate a diver lying in a horizontal position and another person tending the diver;

(c) Have a capability for ingress and egress of personnel and equipment while the occupants are under pressure;

(d) Have a means of operating all installed man-way locking devices, except disabled shipping dogs, from both sides of a closed hatch;

(e) Have interior illumination sufficient to allow visual observation, diagnosis, and medical treatment of an occupant.

(f) Have one bunk for each two occupants;

(g) Have a capability that allows bunks to be seen over their entire lengths from the exterior;

(h) Have a minimum pressure capability of—

(1) 6 ATA, when used for diving to 300 fsw; or

(2) The maximum depth of the dive, when used for diving operations deeper than 300 fsw, unless a closed bell meeting the requirements of § 197.330(a) (3), (4), and (5) is used;

(i) Have a minimum pressurization rate of 2 ATA per minute to 60 fsw and at least 1 ATA per minute thereafter;

(j) Have a decompression rate of 1 ATA per minute to 33 fsw;

(k) Have an external pressure gage for each pressurized compartment;

(l) Have a capability to supply breathing mixtures at the maximum rate required by each occupant doing heavy work; and

(m) Have a sound-powered headset or telephone as a backup to the communications system required by § 197.328(c) (5) and (6), except when that communications system is a sound-powered system.

§ 197.334 Open diving bells.

Each open diving bell must—

(a) Have an upper section that provides an envelope capable of maintaining a bubble of breathing mixture available to a diver standing on the lower section of the platform with his body through the open bottom and his head in the bubble;

(b) Have lifting equipment capable of returning the occupied open bell to the dive location;

(c) Have an umbilical; and

(d) Be—(1) Made of corrosion-resisting material; or

(2) Protected against and maintained free from injurious corrosion.

§ 197.336 Pressure piping.

Piping systems that are not an integral part of the vessel or facility, carrying fluids under pressures exceeding 15 psig must—

(a) Meet the ANSI Code;

(b) Have the point of connection to the integral piping system of the vessel or facility clearly marked; and

(c) Be tested after every repair, modification, or alteration to the pressure boundaries as set forth in § 197.462.

§ 197.338 Compressed gas cylinders.

Each compressed gas cylinder must—

(a) Be stored in a ventilated area;

(b) Be protected from excessive heat;

(c) Be prevented from falling;

(d) Be tested after any repair, modification, or alteration to the pressure boundries as set forth in § 197.462; and

(e) Meet the requirements of—

(1) Part 54 of this Chapter; or

(2) 49 CFR 173.34 and 49 CFR 178 Subpart C.

§ 197.340 Breathing gas supply.

(a) A primary breathing gas supply for surface-supplied diving must be sufficient to support the following for the duration of the planned dive:

(1) The diver.

(2) The standby diver.

(3) The decompression chamber, when required by § 197.432(e)(2) or by § 197.434(a) for the duration of the dive and for one hour after completion of the planned dive.

(4) A decompression chamber when provided but not required by this subpart.

(5) A closed bell when provided or required by § 197.434(d).

(6) An open bell when provided or required by § 197.432(e)(4) or by § 197.434(c).

(b) A secondary breathing gas supply for surface-supplied diving must be sufficient to support the following:

(1) The diver while returning to the surface.

(2) The diver during decompression.

(3) The standby diver.

(4) The decompression chamber when required by § 197.432(e)(2) or by § 197.434(a) for the duration of the dive and one hour after the completion of the planned dive.

(5) The closed bell while returning the diver to the surface.

(6) The open bell while returning the diver to the surface.

(c) A diver-carried reserve breathing gas supply for surface-supplied diving must be sufficient to allow the diver to—

(1) Reach the surface.

(2) Reach another source of breathing gas; or

(3) Be reached by a standby diver equipped with another source of breathing gas for the diver.

(d) A primary breathing gas supply for SCUBA diving must be sufficient to support the diver for the duration of the planned dive through his return to the dive location or planned pick-up point.

(e) A diver-carried reserve breathing gas supply for SCUBA diving must be sufficient to allow the diver to return to the dive location or planned pick-up point from the greatest depth of the planned dive.

(f) Oxygen used for breathing mixtures must—

(1) Meet the requirements of Federal Specification BB-0-925a; and

(2) Be type 1 (gaseous) grade A or B.

(g) Nitrogen used for breathing mixtures must—

(1) Meet the requirements of Federal Specification BB-N-411c;

(2) Be type 1 (gaseous);

(3) Be class 1 (oil free); and

(4) Be grade A, B, or C.

(h) Helium used for breathing mixtures must be grades A, B, or C produced by the Federal Government, or equivalent.

(i) Compressed air used for breathing mixtures must—

(1) Be 20 to 22 percent oxygen by volume;

(2) Have no objectionable odor; and

(3) Have no more than—

(i) 1,000 parts per million of carbon dioxide;

(ii) 20 parts per million carbon monoxide;

(iii) 5 milligrams per cubic meter of solid and liquid particulates including oil; and

(iv) 25 parts per million of hydrocarbons (includes methane and all other hydrocarbons expressed as methane).

§ 197.342 Buoyancy-changing devices.

(a) A dry suit or other buoyancy-changing device not directly connected to the exhaust valve of the helmet or mask must have an independent exhaust valve.

(b) When used for SCUBA diving, a buoyancy-changing device must have

an inflation source separate from the breathing gas supply.

§ 197.344 Inflatable floatation devices.

An inflatable floatation device for SCUBA diving must—

(a) Be capable of maintaining the diver at the surface in a faceup position;

(b) Have a manually activated inflation device;

(c) Have an oral inflation device;

(d) Have an over-pressure relief device; and

(e) Have a manually operated exhaust valve.

§ 197.346 Diver's equipment.

(a) Each diver using SCUBA must have—

(1) Self-contained underwater breathing equipment including—

(i) A primary breathing gas supply with a cylinder pressure gage readable by the diver during the dive; and

(ii) A diver-carried reserve breathing gas supply provided by—

(A) A manual reserve (J valve); or

(B) An independent reserve cylinder connected and ready for use;

(2) A face mask;

(3) An inflatable floatation device;

(4) A weight belt capable of quick release;

(5) A knife;

(6) Swim fins or shoes;

(7) A diving wristwatch; and

(8) A depth gage.

(b) Each diver using a heavyweight diving outfit must—

(1) Have a helmet group consisting of helmet, breastplate, and associated valves and connections;

(2) Have a diving dress group consisting of a basic dress that encloses the body (except for head and hands) in a tough, waterproof cover, gloves, shoes, weight assembly, and knife;

(3) Have a hose group consisting of the breathing gas hose and fittings, the control valve, the lifeline, communications cable, and a pneumofathometer; and

(4) Be provided with a helmet cushion and weighted shoes.

(c) Each surface-supplied dive operation using a heavyweight diving outfit must have an extra breathing gas hose with attaching tools available to the standby diver.

(d) Each diver using a lightweight diving outfit must have—

(1) A safety harness;

(2) A weight assembly capable of quick release;

(3) A mask group consisting of a lightweight mask and associated valves and connections;

(4) A diving dress group consisting of wet or dry diving dress, gloves, shoes or fins, and knife; and

(5) A hose group consisting of the breathing gas hose and fittings, the control valve, the lifeline, communications cable, and a pneumofathometer (if the breaking strength of the communications cable is at least equal to that required for the lifeline, the communications cable can serve as the lifeline).

(e) Each surface-supplied air dive operation within the no-decompression limits and to depths of 130 fsw or less must have a primary breathing gas supply at the dive location.

(f) Each surface-supplied dive operation outside the no-compression limits, deeper than 130 fsw, or using mixed-gas as a breathing mixture must have at the dive location—

(1) A primary breathing gas supply; and

(2) A secondary breathing gas supply.

(g) Each diver diving outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas must have a diver-carried reserve breathing gas supply except when using a heavyweight diving outfit or when diving in a physically confining area.

OPERATIONS

§ 197.400 Applicability.

Diving operations may only be conducted from a vessel or facility subject to the subpart if the regulations in this subpart are met.

§ 197.402 Responsibilities of the person-in-charge.

(a) The person-in-charge shall—

(1) Be fully cognizant of the provisions of this subpart;

(2) Prior to permitting any commercial diving operation to commence, have—

(i) The designation of the diving supervisor for each diving operation as required by § 197.210;

(ii) A report on—

(A) The nature and planned times of the planned diving operation; and

(B) The planned involvement of the vessel or facility, its equipment, and its personnel in the diving operation.

(b) Prior to permitting any commerical diving operation involving liveboating to commence, the person-in-charge shall insure that—

(1) A means of rapid communications with the diving supervisor while the diver is entering, in, or leaving the water is established; and

(2) A boat and crew for diver pickup in the event of an emergency is provided.

(c) The person-in-charge shall insure that a boat and crew for SCUBA diver pickup is provided when SCUBA divers are not line-tended from the dive location.

(d) The person-in-charge shall coordinate the activities on and of the vessel or facility with the diving supervisor.

(e) The person-in-charge shall insure that the vessel or facility equipment and personnel are kept clear of the dive location except after coordinating with the diving supervisor.

§ 197.404 Responsibilities of the diving supervisor.

(a) The diving supervisor shall—

(1) Be fully cognizant of the provisions of this subpart;

(2) Be fully cognizant of the provisions of the operations manual required by § 197.420;

(3) Insure that diving operations conducted from a vessel or facility subject to this subpart meet the regulations in this subpart;

(4) Prior to the commencement of any commercial diving operation, provide the report required by § 197.402 to the person-in-charge;

(5) Coordinate with the person-in-charge any changes that are made to the report required by § 197.402; and

(6) Promptly notify the person-in-charge of any diving related casualty, accident, or injury.

(b) The diving supervisor is in charge of the planning and execution of the diving operation including the responsibility for the safety and health of the dive team.

§ 197.410 Dive procedures.

(a) The diving supervisor shall insure that—

(1) Before commencing diving operations, dive team members are briefed on—

(i) The tasks to be undertaken;

(ii) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation; and

(iii) Any modifications to the operations manual or procedures including safety procedures necessitated by the specific diving operation;

(2) The breathing gas supply systems, masks, helmets, thermal protection, when provided, and bell lifting equipment, when a bell is provided or required, are inspected prior to each diving operation;

(3) Each diver is instructed to report any physical problems or physiological effects including aches, pains, current illnesses, or symptoms of decompression sickness prior to each dive;

(4) A depth, bottom time profile, including any breathing mixture changes, is maintained at the dive location for each diver during the dive, except that SCUBA divers shall maintain their own profiles;

(5) A two-way voice communication system is used between—

(i) Each surface-supplied diver and a dive team member at the dive location or bell (when provided); and

(ii) The bell (when provided) and the dive location;

(6) A two-way communication system is available at the dive location to obtain emergency assistance;

(7) After the completion of each dive—

(i) The physical condition of the diver is checked by—

(A) Visual observation; and

(B) Questioning the diver about his physical well-being;

(ii) The diver is instructed to report any physical problems or adverse physiological effects including aches, pains, current illnesses, or symptoms of decompression sickness or gas embolism;

(iii) The diver is advised of the location of an operational decompression chamber; and

(iv) The diver is alerted to the potential hazards of flying after diving;

(8) For any dive outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas as a breathing mixture—

(i) A depth, time, decompression profile including breathing mixture changes is maintained for each diver at the dive location;

(ii) The diver is instructed to remain awake and in the vicinity of the dive location decompression chamber for at least one hour after the completion of a dive, decompression, or treatment; and

(iii) A dive team member, other than the diver, is trained and available to operate the decompression chamber; and

(9) When decompression sickness or gas embolism is suspected or symptoms are evident, a report is completed containing—

(i) The investigation for each incident including—

(A) The dive and decompression profiles;

(B) The composition, depth, and time of breathing mixture changes;

(C) A description of the symptoms including depth and time of onset; and

(D) A description and results of the treatment;

(ii) The evaluation for each incident based on—

(A) The investigation;

(B) Consideration of the past performance of the decompression table used; and

(C) Individual susceptibility; and

(iii) The corrective action taken, if necessary, to reduce the probability of recurrence.

(b) The diving supervisor shall ensure that the working interval of a dive is terminated when he so directs or when—

(1) A diver requests termination;

(2) A diver fails to respond correctly to communications or signals from a dive team member;

(3) Communications are lost and can not be quickly reestablished between—

(i) The diver and a dive team member at the dive location; or

(ii) The person-in-charge and the diving supervisor during liveboating operations; or

(4) A diver begins to use his diver-carried reserve breathing gas supply.

§ 197.420 Operations manual.

(a) The diving supervisor shall—

(1) Provide an operations manual to the person-in-charge prior to commencement of any diving operation; and

(2) Make an operations manual available at the dive location to all members of the dive team.

(b) The operations manual must be modified in writing when adaptation is required because of—

(1) The configuration or operation of the vessel or facility; or

(2) The specific diving operation as planned.

(c) The operations manual must provide for the safety and health of the divers.

(d) The operations manual must contain the following:

(1) Safety procedures and checklists for each diving mode used.

(2) Assignments and responsibilities of each dive team member for each diving mode used.

(3) Equipment procedures and checklists for each diving mode used.

(4) Emergency procedures for—

(i) Fire;

(ii) Equipment failure;

(iii) Adverse environmental conditions including, but not limited to, weather and sea state;

(iv) Medical illness; and

(v) Treatment of injury.

(5) Procedures dealing with the use of—

(i) Hand-held power tools;

(ii) Welding and burning equipment; and

(iii) Explosives.

SPECIFIC DIVING MODE PROCEDURES

§ 197.430 SCUBA diving.

The diving supervisor shall insure that—

(a) SCUBA diving is not conducted—

(1) Outside the no-decompression limits;

(2) At depths greater than 130 fsw;

(3) Against currents greater than one (1) knot unless line-tended; and

(4) If a diver cannot directly ascend to the surface unless line-tended;

(b) The SCUBA diver has the equipment required by § 197.346(a);

(c) A standby diver is available while a diver is in the water;

(d) A diver is line-tended from the surface or accompanied by another diver in the water in continuous visual contact during the diving operation;

(e) When a diver is in a physically confining space, another diver is stationed at the underwater point of entry and is line-tending the diver; and

(f) A boat is available for diver pickup when the divers are not line-tended from the dive location.

§ 197.432 Surface-supplied air diving.

The diving supervisor shall insure that—

(a) Surface-supplied air diving is conducted at depths less than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw;

(b) Each diving operation has a primary breathing gas supply;

(c) Each diver is continuously tended while in the water;

(d) When a diver is in a physically confining space, another diver is stationed at the underwater point of entry and is line-tending the diver;

(e) For dives deeper than 130 fsw or outside the no-decompression limits—

(1) Each diving operation has a secondary breathing gas supply;

(2) A decompression chamber is ready for use at the dive location;

(3) A diving stage is used except when a bell is provided;

(4) A bell is used for dives with an in-water decompression time greater than 120 minutes, except when the diver is using a heavy-weight diving outfit or is diving in a physically confining space;

(5) A separate dive team member tends each diver in the water;

(6) A standby diver is available while a diver is in the water; and

(7) Each diver has a diver-carried reserve breathing gas supply except when using a heavy-weight diving outfit or when diving in a physically confining space; and

(f) The surface-supplied air diver has the equipment required by § 197.346 (b) or (d).

§ 197.434 Surface-supplied mixed-gas diving.

The diving supervisor shall insure that—

(a) When mixed-gas diving is conducted, a decompression chamber or a closed bell meeting the requirements of § 197.332 is ready for use at the dive location;

(b) A diving stage is used except when a bell is provided;

(c) A bell is used for dives deeper than 220 fsw or when the dive involves in-water decompression times greater than 120 minutes, except when the diver is using a heavy-weight diving outfit or is diving in a physically confining space;

(d) A closed bell is used for dives at depths greater than 300 fsw, except when diving is conducted in a physically confining space;

(e) A separate dive team member tends each diver in the water;

(f) A standby diver is available during all nonsaturation dives;

(g) When saturation diving is conducted—

(1) A standby diver is available when the closed bell leaves the dive location until the divers are in saturation; and

(2) A member of the dive team at the dive location is a diver able to assist in the recovery of the closed bell or its occupants, if required;

(h) When closed bell operations are conducted, a diver is available in the closed bell to assist a diver in the water;

(i) When a diver is in a physically confining space, another diver is stationed at the underwater point of entry and is line-tending the diver;

(j) Each diving operation has a primary and secondary breathing gas supply meeting the requirements of § 197.340; and

(k) The surface-supplied mixed-gas diver has the equipment required by § 197.346 (b) or (d).

§ 197.436 Liveboating.

(a) During liveboating operations, the person-in-charge shall insure that—

(1) Diving is not conducted in seas that impede station-keeping ability of the vessel;

(2) Liveboating operations are not conducted—

(i) From 1 hour after sunset to 1 hour before sunrise; or

(ii) During periods of restricted visibility;

(3) The propellers of the vessel are stopped before the diver enters or exits the water; and

(4) A boat is ready to be launched with crew in the event of an emergency.

(b) As used in paragraph (a)(2)(ii) of this section, "restricted visibility" means any condition in which vessel navigational visibility is restricted by fog, mist, falling snow, heavy rainstorms, sandstorms or any other similar causes.

(c) During liveboating operations, the diving supervisor shall insure that—

(1) Diving is not conducted at depths greater than 220 fsw;

(2) Diving is not conducted in seas that impede diver mobility or work function;

(3) A means is used to prevent the diver's hose from entangling in the propellers of the vessel;

(4) Each diver carries a reserve breathing gas supply;

(5) A standby diver is available while a diver is in the water;

(6) Diving is not conducted with in-water decompression times greater than 120 minutes; and

(7) The person-in-charge is notified before a diver enters or exits the water.

PERIODIC TESTS AND INSPECTIONS OF DIVING EQUIPMENT

§ 197.450 Breathing gas tests.

The diving supervisor shall insure that—

(a) The output of each air compressor is tested and meets the requirements of § 197.340 for quality and quantity by means of samples taken at the connection point to the distribution system—

(1) Every 6 months; and

(2) After every repair or modification.

(b) Purchased supplies of breathing mixtures supplied to a diver are checked before being placed on line for—

(1) Certification that the supply meets the requirements of § 197.340; and

(2) Noxious or offensive odor and oxygen percentage;

(c) Each breathing supply system is checked, prior to commencement of diving operations, at the umbilical or underwater breathing apparatus connection point for the diver, for noxious or offensive odor and presence of oil mist; and

(d) Each breathing supply system, supplying mixed-gas to a diver, is checked, prior to commencement of diving operations, at the umbilical or underwater breathing apparatus connection point for the diver, for percentage of oxygen.

§ 197.452 Oxygen cleaning.

The diving supervisor shall ensure that equipment used with oxygen or oxygen mixtures greater than 40 percent by volume is cleaned of flammable materials—

(a) Before being placed into service; and

(b) After any repair, alteration, modification, or suspected contamination.

§ 197.454 First aid and treatment equipment.

The diving supervisor shall ensure that medical kits are checked monthly to insure that all required supplies are present.

§ 197.456 Breathing supply hoses.

(a) The diving supervisor shall insure that—

(1) Each breathing supply hose is pressure tested prior to being placed into initial service and every 24 months thereafter to 1.5 times its maximum working pressure;

(2) Each breathing supply hose assembly, prior to being placed into initial service and after any repair, modification, or alteration, is tensile tested by—

(i) Subjecting each hose-to-fitting connection to a 200 pound axial load; and

(ii) Passing a visual examination for evidence of separation, slippage, or other damage to the assembly;

(3) Each breathing supply hose is periodically checked for—

(i) Damage which is likely to affect pressure integrity; and

(ii) Contamination which is likely to affect the purity of the breathing mixture delivered to the diver; and

(4) The open ends of each breathing supply hose are taped, capped, or plugged when not in use.

(b) To meet the requirements of paragraph (a)(3) of this section, each breathing supply hose must be—

(1) Carefully inspected before being shipped to the dive location;

(2) Visually checked during daily operation; and

(3) Checked for noxious or offensive odor before each diving operation.

§ 197.458 Gages and timekeeping devices.

The diving supervisor shall insure that—

(a) Each depth gage and timekeeping device is tested or calibrated against a master reference gage or time- keeping device every 6 months;

(b) A depth gage is tested when a discrepancy exists in a depth gage reading greater than 2 percent of full scale between any two gages of similar range and calibration;

(c) A timekeeping device is tested when a discrepancy exists in a timekeeping device reading greater than one-quarter of a minute in a 4-hour period between any two timekeeping devices; and

(d) Each depth gage and timekeeping device is inspected before diving operations are begun.

§ 197.460 Diving equipment.

The diving supervisor shall insure that the diving equipment designated for use in a dive under § 197.346 is inspected before each dive.

§ 197.462 Pressure vessels and pressure piping.

(a) The diving supervisor shall insure that each volume tank, cylinder, PVHO, and pressure piping system has been examined and tested every 12 months and after any repair, modification, or alteration to the extent necessary to determine that they are in condition and fit for the service intended.

(b) The following tests must be made to meet the annual requirements of paragraph (a) of this section:

(1) An internal and external visual examination for mechanical damage or deterioration. If a defect is found that may impair the safety of the pressure vessel, a hydrostatic test must be performed.

(2) A leak test.

(3) A pneumatic test.

(4) A hydrostatic test every fifth year instead of the pneumatic test.

(c) The following tests must be made after any repair, modification, or alteration to meet the requirements of paragraph (a) of this section:

(1) An internal and external visual examination for correctness and adequacy of repair, modification, or alteration.

(2) A leak test.

(3) A hydrostatic test when the repair, modification, or alteration affects the pressure boundary.

(d) When the pneumatic test on pressure vessels is conducted—

(1) The test pressure must be the maximum allowable working pressure stamped on the pressure vessel; and

(2) The test may be conducted only after suitable precautions are taken to protect personnel and equipment.

(e) When the pneumatic test on pressure piping is conducted

(1) The test pressure must be no less than 90 percent of the setting of the relief device; and

(2) The test may be conducted only after suitable precautions are taken to protect personnel and equipment.

(f) When a hydrostatic test on a pressure vessel is made, the test pressure must be—

(1) 1¼ times the pressure stamped on the pressure vessel built to division 2 of the ASME Code; and

(2) 1½ times the pressure stamped on the pressure vessel built to division 1 of the ASME Code.

(g) When a hydrostatic test on pressure piping is conducted, the test must be conducted in accordance with the ANSI Code.

(h) When the leak test on pressure vessels or pressure piping is conducted—

(1) The test must be conducted with the breathing mixture normally used in service;

(2) The test must be conducted at the maximum allowable working pressure; and

(3) The test pressure must be maintained for a minimum of 10 minutes to allow checking all joints, connections, and regions of high stress for leakage.

RECORDS

§ 197.480 Logbooks.

(a) The person-in-charge of a vessel or facility required by 46 U.S.C. 201 to have an official logbook shall maintain the logbook on form CG-706.

(b) The person-in-charge of a vessel or facility not required by 46 U.S.C. 201 to have an official logbook, shall maintain, on board, a logbook for making the entries required by this subpart.

(c) The diving supervisor conducting commercial diving operations from a vessel or facility subject to this subpart shall maintain a logbook for making the entries required by this subpart.

§ 197.482 Logbook entries.

(a) The person-in-charge shall insure that the following information is recorded in the logbook for each commercial diving operation:

(1) Date, time, and location at the start and completion of dive operations.

(2) Approximate underwater and surface conditions (weather, visibility, temperatures, and currents).

(3) Name of the diving supervisor.

(4) General nature of work performed.

(b) The diving supervisor shall insure that the following information is recorded in the logbook for each commercial diving operation:

(1) Date, time, and location at the start and completion of each dive operation.

(2) Approximate underwater and surface conditions (weather, visibility, temperatures, and currents).

(3) Names of dive team members including diving supervisor.

(4) General nature of work performed.

(5) Repetitive dive designation or elapsed time since last hyperbaric exposure if less than 24 hours for each diver.

(6) Diving modes used.

(7) Maximum depth and bottom time for each diver.

(8) Name of person-in-charge.

(9) For each dive outside the no-decompression limits, deeper than 130 fsw, or using mixed-gas, the breathing gases and decompression table designations used.

(10) When decompression sickness or gas embolism is suspected or symptoms are evident—

(i) The name of the diver; and

(ii) A description and results of treatment.

(11) For each fatality or any diving related injury or illness that results in incapacitation of more than 72 hours or requires any dive team member to be hospitalized for more than 24 hours—

(i) The date;

(ii) Time;

(iii) Circumstances; and

(iv) Extent of any injury or illness.

(c) The diving supervisor shall insure that the following is recorded in the logbook for each diving operation deviating from the requirements of this subpart:

(1) A description of the circumstances leading to the situation.

(2) The deviations made.

(3) The corrective action taken, if appropriate, to reduce the possibility of recurrence.

(d) The diving supervisor shall insure that a record of the following is maintained:

(1) The date and results of each check of the medical kits.

(2) The date and results of each test of the air compressor.

(3) The date and results of each check of breathing mixtures.

(4) The date and results of each check of each breathing supply system.

(5) The date, equipment cleaned, general cleaning procedure, and names of persons cleaning the diving equipment for oxygen service.

(6) The date and results of each test of the breathing supply hoses and system.

(7) The date and results of each inspection of the breathing gas supply system.

(8) The date and results of each test of depth gages and timekeeping devices.

(9) The date and results of each test and inspection of each PVHO.

(10) The date and results of each inspection of the diving equipment.

(11) The date and results of each test and inspection of pressure piping.

(12) The date and results of each test and inspection of volume tanks and cylinders.

(e) The diving supervisor shall insure that a notation concerning the location of the information required under paragraph (d) is made in the logbook.

NOTE.—R.S. 4290 (46 U.S.C. 201) requires that certain entries be made in an official logbook in addition to the entries required by this section; and R.S. 4291 (46 U.S.C. 202) prescribes the manner of making those entries.

§ 197.484 Notice of casualty.

(a) In addition to the requirements of subpart 4.05 of this chapter and 33 CFR 146.01-20, the person-in-charge shall notify the Officer-in-Charge, Marine Inspection, as soon as possible after a diving casualty occurs, if the casualty involves any of the following:

(1) Loss of life.

(2) Diving-related injury to any person causing incapacitation for more than 72 hours.

(3) Diving-related injury to any person requiring hospitalization for more than 24 hours.

(b) The notice required by this section must contain the following:

(1) Name and official number (if applicable) of the vessel or facility.

(2) Name of the owner or agent of the vessel or facility.

(3) Name of the person-in-charge.

(4) Name of the diving supervisor.

(5) Description of the casualty including presumed cause.

(6) Nature and extent of the injury to persons.

(c) The notice required by this section is not required if the written report required by § 197.486 is submitted within 5 days of the casualty.

§ 197.486 Written report of casualty.

The person-in-charge of a vessel or facility for which a notice of casualty was made under § 197.484 shall submit a report to the Officer-in-Charge, Marine Inspection, as soon as possible after the casualty occurs, as follows:

(a) On form CG-924E, when the diving installation is on a vessel.

(b) Using a written report, in narrative form, when the diving installation is on a facility. The written report must contain the information required by § 197.484.

(c) The report required by this section must be accompanied by a copy of the report required by § 197.410(a)(9) when decompression sickness is involved.

§ 197.488 Retention of records after casualty.

(a) The owner, agent, or person-in-charge of a vessel or facility for which a report of casualty is made under § 197.484 shall retain all records onboard that are maintained on the vessel or facility and those records required by this subpart for 6 months after the report of a casualty is made or until advised by the Officer-in-Charge, Marine Inspection, that records need not be retained onboard.

(b) The records required by paragraph (a) of this section to be retained on board include, but are not limited to, the following:

(1) All logbooks required by § 197.480.

(2) All reports required by § 197.402(a)(2)(ii), § 197.404(a)(4), § 197.410(a)(9).

(c) The owner, agent, person-in-charge, or diving supervisor shall, upon request, make the records described in this section available for examination by any Coast Guard official authorized to investigate the casualty.

APPENDIX A

The following table gives the depth versus bottom time limits for single, no-decompression, air dives made within any 12-hour period. The limit is the maximum bottom time in minutes that a diver can spend at that depth without requiring decompression beyond that provided by a normal ascent rate of 60 fsw per minute. (Although bottom time is concluded when ascent begins, a slower ascent rate would increase the bottom time thereby requiring decompression.) An amount of nitrogen remains in the tissues of a diver after any air dive, regardless of whether the dive was a decompression or no-decompression dive. Whenever another dive is made within a 12-hour period, the nitrogen remaining in the blood and body tissues of the diver must be considered when calculating his decompression.

AIR NO-DECOMPRESSION LIMITS

Depth (feet):	*No-decompression limits (minutes)*
35	310
40	200
50	100
60	60
70	50
80	40
90	30
100	25
110	20
120	15
130	10

(Source: U.S. Navy Diving Manual, 1 September 1973.)

(46 U.S.C. 239; 46 U.S.C. 390b; 46 U.S.C. 391a; 33 U.S.C. 1509(b); 43 U.S.C. 1333(d)(1); 43 U.S.C. 1331 et seq., as amended by Sec. 203 and 208 of Pub. L. 95-372; 46 U.S.C. 395; 46 U.S.C. 375; 46 U.S.C. 391; 46 U.S.C. 392; 46 U.S.C. 416; 49 U.S.C. 1655(b); 49 CFR 1.46 (b) and (s).)

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R. H. SCARBOROUGH,
Vice Admiral, U.S. Coast Guard,
Acting Commandant.

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